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IN TWO SECTIONS

Section I

NATIONAL ASSOCIATION OF ACCOUNTANTS LIBRARY

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EDITORIAL DEPARTMENT NOTE

It is pleasing to note the continued progress being made by industrial accountants in the field of cost control. Of course, there are those who say that "cost control" is a misnomer as applied to the cost accountant; that the accountant does not control costs, but merely provides the information which others use for control purposes. Such a viewpoint fails to give sufficient weight to the "incentive for action" that properly analyzed and presented figures may have. It is true that in the day of strictly historical costs and delayed reports, the accountant had little reason for exultation over his part in the control of costs. But much progress has been made in recent years and today the cost accountant is right in the center of the control picture. Two examples will serve to indicate the present trend. Accountants have been inclined to think of inventory control as a system of records which would provide when needed all pertinent data on the receipts, issuances, and balances for each type of raw material, part or finished product. That this viewpoint is out of date was demonstrated by two articles in the *Bulletin* of February 15, in which were presented the part of the accountant in utilizing the information in the records to actively control inventories through reports which demand action when conditions warrant. A second example of the accountant's part in cost control is provided by the two articles in this issue of the *Bulletin*. The progressive accountant is not content to compare direct and indirect labor costs with standard or budget figures, and report the variances after it is too late to do anything about them. More and more, as these two articles illustrate, he is assisting management to plan labor costs in advance and then provide current reports on any deviation from planned performance in order that unfavorable variances may be detected before they become serious. This is the essence of cost control.

The author of our first article is a former accountant who now serves as President of his company. Frank O. Henshaw gained his academic training at Houghton College, from which he received the A.B. degree in 1926. Following four years in general and public accounting, he joined the Flexlume Corp. of Buffalo in 1930 as Accountant. He later became Secretary and Treasurer of the corporation and was recently made President. He is a member of our Buffalo Chapter.

Our second article is by A. Martin of the Manufacturing General Department of the General Electric Co. of Schenectady. Mr. Martin joined General Electric in 1929, following his graduation from the electrical engineering course at the University of Texas. He has continued his education at Union College in Schenectady and in the G. E. engineering testing course. He has served his company in the field of high voltage research and as a member of the staff of the factory manager charged with expense control. Since 1935 he has been on the staff of the General Supervisor of Costs, giving particular attention to expense budgeting and control. Mr. Martin's article was presented as an address before the Boston Chapter.

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NATIONAL ASSOCIATION OF
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APRIL 1, 1938

LABOR CONTROL IN THE SIGN SHOP

By Frank O. Henshaw, President,
Flexlume Corporation, Buffalo, N. Y.

WE MUST think of the sign shop as a job shop making individual signs which range in price from just a few dollars to several thousands of dollars, in all shapes and sizes. Some are all metal, some a combination of metal, glass, and glass tubing, and some all glass tubing; some are non-illuminated, some illuminated; some have high voltage problems, and others create many more problems of construction in securing the advertising effect the customer requires.

This variety of sizes, shapes and lighting effects precludes the use of machine operation to a great degree and makes the direct labor cost a high percentage of the total cost of the sign. Therefore, it is apparent that labor control should be given more than average attention in the sign shop.

In manufacturing a sign or signs, the construction employed by the engineering and drafting departments is the controlling factor with respect to the material cost. In other words, a bill of material can be made out from the full-sized pattern and prices can be extended to give the proper material cost. Just ordinary storeroom control is needed to compute an accurate material cost.

Problem of Controlling Labor Costs

But even though the proper labor cost is directly dependent on the type of construction used by the engineering and drafting departments, as is the material cost, and can be very accurately estimated, the problem is far from solved at this point. There must be some method of recording the labor dollars per job swiftly enough so that it can be determined as the job progresses in the shop, whether the labor dollars are proportionate to this progress. Otherwise it is just a matter of reviewing history, and we all recognize, I believe, that so-called historical costs do not have nearly the value to a job shop that they have to the production or standard cost setup. This current control of the labor dollar is especially important in the sign business, as most of the shops employ union help at reasonably high hourly rates with the attendant direct labor expenses, such as insurance and taxes based

on payroll, (and I do not think these items should be confused with regular overhead, since they are payable in the same kind of cash as wages and the obligation is just as evident). Hence it is very easy, through exceeding the labor allowance, to wipe out the profit and throw the job in the red.

In addition to the labor control problem and closely allied with it in a shop where sizes and descriptions of the items being simultaneously manufactured vary so greatly, is the problem of production control. By that I mean scheduling these jobs through the plant to meet definite shipping dates.

Installation of Equipment

Realizing these facts in our own plant and keeping our ideal before us constantly, we began experimenting with all forms of modern accounting methods and machinery that seemed at all adaptable to our business, and finally while struggling with the item of scheduling and following the jobs through the shop, we began to consider telautograph equipment. As we were discussing the details of follow-up through this medium, it occurred to us that there should be no reason why the shop men could not write in on the telautograph machines just as easily as they could put the information on a time card and ring in.

So we called in our superintendent to discuss the possibilities of such a setup. And let me say here that the installation of this system, and, I believe, the installation of any cost system should be thoroughly discussed with and sold to the superintendent or plant manager of any shop before definite steps are taken. Unless he and his organization of foremen are with the plan 100 per cent, much grief can result.

After discussing all phases, we drew up the necessary forms and installed the proper telautograph equipment, and for the past three years it has performed perfectly. It is not only the fastest method, but the most complete and the least expensive method of any we have tried. It works so simply that we wonder why we didn't think of it sooner.

Briefly, here is the setup and method of operation. Based on statistics showing the number of entries currently being made on the time cards, telautograph combination sending and receiving machines were installed throughout the shop. In our case, eight

of these machines were required. The machines are simple, small, and easily installed to a wall, post or other stationary object. In the office a combination sending and receiving set with an auxiliary receiving set was installed. The purpose of the auxiliary receiver is obvious, since simultaneously as the operator writes, his report is being reproduced on the receiver in front of him and on the receiver in the office in his own handwriting. We were doubtful at this point as to whether two receivers in the office would handle the traffic, but it has proved satisfactory and no change has been necessary.

The Payroll Record

Now, since we had done away with the workman's job time tickets and had elected to do this work in the office, we had to draw up forms on which to keep these records. First, we drew up the payroll record (Exhibits 1 and 2) on which the operator posts the time in tenths of hours and extends as he goes. It will be noticed that this is a weekly card with a column for each day, and a place for summaries on the reverse side. The summaries are compact but complete, showing hours and amounts per day with a place for extra rates due to overtime. Deductions for social security taxes, savings, insurance, union dues and even garnishees are provided for. Then, there is provision for summarizing any non-productive hours and amounts by account numbers.

I might say here, that with this setup we have handled the records of upwards of one hundred fifty men during peak seasons and one operator has handled all the work—both the payroll and the cost work which is described below. Since he extends as he makes his entries, it takes him less than a half hour to complete his payroll each night before he leaves. It can also be seen that making up the summaries and the complete payroll at the end of the week is a very simple operation and takes little time, since all facts regarding an employee are on the one card and balanced daily.

The Job Card

The next and only other card form kept in the operation of this system is the Job Card (Exhibits 3 and 4) which is the combination cost and production record.

CLOCK NO.	NAME	WEEK ENDING

	MONDAY				TUESDAY				WEDNESDAY				THURSDAY			
	TIME	HOURS	EXT.	JOB No.	TIME	HOURS	EXT.	JOB No.	TIME	HOURS	EXT.	JOB No.	TIME	HOURS	EXT.	JOB No.
IN																
OUT																
IN																
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OUT																
TOTALS																

EXHIBIT 1—PAYROLL RECORD (FACE)

CLOCK No. | NAME | WEEK ENDING

	FRIDAY				SATURDAY				SUNDAY			
	TIME	HOURS	EXT.	JOB No.	TIME	HOURS	EXT.	JOB No.	TIME	HOURS	EXT.	JOB No.
IN												
OUT												
IN												
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TOTALS												

PAYROLL SUMMARY

DAY	HOUR	AMOUNT
MONDAY		
TUESDAY		
WEDNESDAY		
THURSDAY		
FRIDAY		
SATURDAY		
OVERTIME		
TOTALS		

DEDUCTIONS

ACCOUNT	AMOUNT
S. S	
BANK	
INS.	
UNION	
GARN.	
TO BE PAID	

SUMMARY NON-PROD. LABOR

ACC'T No.	HOURS	EXT.
TOTALS		

EXHIBT 2—PAYROLL RECORD (REVERSE)

SHOP ORDER				READING				DATE CONTRACT	ORDER REC'D	OUT OF CREDIT	OUT OF PRODUCT	IN ENG.		AGENT	
IN PATTERN	DITTO TYPED	PATT. TO METAL	PORC. TO ENAMEL	PORC IN	METAL OUT	GLASS IN	GLASS OUT	PATT. IN NEON	NEON OUT	SIGN IN FINISH	FINISH OUT	SIGN IN SHIPP.	ALUMILITE MOULDS & WOOD	ALUMILITE MOULDS & WOOD	
$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

	METAL (ALLOW						ELECTRIC (ALLOW						NEON (ALLOW					
	TIME	DATE	CLOCK	HRS.	EXT.	ACCUM.	TIME	DATE	CLOCK	HRS.	EXT.	ACCUM.	TIME	DATE	CLOCK	HRS.	EXT.	ACCUM.
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	TOTALS						TOTALS						TOTALS					

EXHIBIT 3—JOB CARD (FACE)

JOB NO.	NAME	MATERIAL	%	LABOR	%	TOTAL	%	NET FACTORY	%
		A		A		A		A	
		E		E		E		E	

	FINISHING (ALLOW						SHIPPING (ALLOW						DRAFTING (ALLOW					
	TIME	DATE	CLOCK	HRS.	EXT.	ACCUM.	TIME	DATE	CLOCK	HRS.	EXT	ACCUM.	TIME	DATE	CLOCK	HRS.	EXT.	ACCUM.
IN																		
OUT																	

The top portion of the front side of this card provides for a complete record of the progress of the job from the time the contract is received right through to the shipment of the sign. This card is made out in the credit department at the time it passes credit on the order and is given directly to the cost clerk, thus insuring proper control from the start. Space is provided for schedule dates into each department and directly underneath these are placed the actual dates. This makes it easy for the clerk to advise the factory superintendent on the form shown as Exhibit 5 of the tardy arrival of the job in a certain department.

PRODUCTION WARNING #277

Shop Order.....

Dept. .....

Scheduled in.....

Actually in.....

Scheduled out.....

EXHIBIT 5

These production warning slips are white in color and are numbered so that the superintendent can tell when one has missed him. On the reverse side of the card there is a space for special materials on order. This is for production purposes and gives the production department the information necessary to follow the purchasing department. This is especially important on rush jobs. Rush jobs are indicated by a red celluloid clip on the card and if the job is being delayed through waiting for special materials, a blue clip is attached to keep it before the attention of the operator. So much for the production part of the card. I will touch later on the advantages realized by incorporating this function on the same card with the cost record.

The Cost Record

The balance of the card is for cost purposes only and is arranged according to departments. Each department has a column

and at the top of each column is a place for the labor dollar allowance for each department. This information comes from the pricing clerk who checks the contract for prices and arrives at the proper net factory cost. He reports the labor allowances on the form shown as Exhibit 6 in accordance with the amounts allowed in the estimate.

Shop Order No..... Net Factory.....

Metal ..... Finishing .....

Electrical ..... Shipping .....

Neon ..... Drafting .....

Misc. .....

EXHIBIT 6—LABOR ALLOWANCES

The pricing operation follows the passing of the credit and the form shown as Exhibit 6 goes to the cost clerk who transfers the information to the job card. The information called for in the departmental columns is taken directly off the payroll card, with the extensions being accumulated in the last column as they are posted so that a running comparison with the allowance is maintained. When the accumulated actual labor dollars spent reaches two-thirds of the allowance a Labor Warning Slip (Exhibit 7) is made out by the operator and given to the superintendent, who checks the job to determine if it is at least two-thirds finished in the shop.

LABOR WARNING SLIP #277

Shop Order No..... Dept.....

Allowed Labor .....

Actual Labor .....

Date ..... Time .....

EXHIBIT 7

Naturally it is not necessary for the superintendent to wait for these warning slips to come through, but these slips do insure a check-up on every job at that point. Many times daily the superintendent and foremen call the operator on the phone about the labor cost condition of certain jobs and because he has a running accumulated balance of actual labor directly under his allowance, he has but to glance at the card and read the information to them.

Advantages Summarized

This, I believe, gives you our complete setup. Let me briefly summarize the advantages we have gained and at the same time justify the combining of the cost and production work.

First, we have eliminated record keeping by direct labor and at the same time rendered it impossible for someone else to report for any man, because he writes in and his own handwriting appears.

Second, we have eliminated all payroll and cost reconciliation problems because both records are kept simultaneously in the same spot, by the same operator, and extended and completed immediately as changes occur. Reconciliations are merely a matter of adding machine tapes.

Third, we have eliminated a difficult production follow-up problem in a most direct and accurate manner, because a glance at the combination cost and production card not only reveals where the job is in the factory, but what men are working on it at the moment and how near completed it is by a comparison of the cost with the allowance. This is true because you will notice that we transfer not only the total spent from the payroll card to the job card, but carry the men's "in" and "out" record currently as well. This might seem like unnecessary work, but has proven very beneficial in checking the men's efficiency on different types of construction, as well as contributing to the production follow-up.

Fourth, the overall cost of the setup is less than any other we ever had.

Fifth, and the real purpose of the system is that labor dollars expended are instantly interpreted in terms of cost of jobs to provide actual direct labor cost control.

Many other minor advantages have been realized, but they are more or less obvious to the experienced cost man and are not worthy of space here.

You will find on the reverse side of the job card a summary of material and labor with percentages to the net factory price. This is for the purpose of checking against estimates. After all comparisons are made, these combination cost and production cards are filed with the office folder on the job, furnishing a most complete record for any future reference to the job.

THE CONTROL OF DIRECT AND INDIRECT LABOR COSTS

By A. Martin, Manufacturing General Department, General Electric Company, Schenectady, N. Y.

THE SUBJECT of this paper is familiar to most of us, but a brief space devoted to defining terms will, perhaps, be worth while.

1. I shall define *control* as the act, process, method or technique of maintaining the labor elements of cost within, or as near as possible to, planned standards, using present knowledge, equipment and methods.
2. I shall define direct labor as the manual labor of performing, either by hand or machine, the well-defined manufacturing operations which actually further the progress of a commercial product, and which can be definitely and accurately allocated to a specific part, operation or process.
3. I shall define indirect labor as that labor, both manual and mental, necessary to control and expedite actual production and carry on the many not strictly manufacturing activities which are incident to, and a necessary part of, any manufacturing enterprise. My remarks shall relate to only "manufacturing" indirect labor and shall exclude labor pertaining to engineering, research and commercial activities.

Direct Labor

The control of direct labor necessitates *knowledge* of "how much it should be" and "how much it is." The direct labor cost of performing an operation or building a unit of product complete is a function of two factors:

1. Rate of pay of operator.
2. Time required.

Hence, to control the cost, we must control these factors. This means that standards for each must be established and maintained, and actual performance must be made to approximate these standards.

Rate of Pay of Operator

In my discussion I shall use the term "normal operator," and I shall define a normal operator as one who possesses the requisite mental and physical characteristic, skill and knowledge of the job, and who puts forth good effort. To insure that operators will be "normal operators," good judgment must be exercised in the selection of employees, and each new employee (or old employee assigned to a new job) must be adequately instructed and trained. It is the employment department's responsibility to select from the applicants only those individuals who possess the requisite mental and physical characteristics for the job to be filled. An applicant's characteristics and qualifications can be reasonably ascertained by:

1. Individual history and investigation
2. Mechanical-aptitude tests
3. Finger-dexterity tests
4. Clerical tests
5. Physical examination

The new employee must be instructed and trained. In our opinion this can, when practical, be most effectively done in a special training room under the supervision of competent instructors. The employee can be instructed as to company policy, methods of wage payments, etc. Mechanical operators can be trained for the job they are to fill in the actual production process, emphasis being placed on fundamentals of motion economy, safety, quality of

work and alertness. Individuals who do not prove to be qualified for the job for which they were employed can be identified in the training room and transferred to other work for which they are qualified, or they may be dismissed, thereby reducing the possibility of subsequent poor work, high cost, low earnings and dissatisfaction. Older employees who for any reason are not working effectively on actual production can be brought to the training room for observation and training. In many such cases, a short period in the training room has transformed such an individual into an effective operator, thereby contributing to production efficiency and employee satisfaction, both of which are prime essentials in control of labor costs. In other cases, employees may prove to be not qualified for the particular type of work they are doing, and can be transferred to other work for which they are qualified. If special training rooms are not practical in a particular factory or department, the foreman to whom the employee is assigned must be responsible for his instruction and training.

The hourly rate of compensation of a *normal operator* is determined by the company policy relative to wage rates in general, and by the relative value of the particular job or occupation compared with all other occupations. The value of a particular job or occupation in relation to other occupations is a matter of job evaluation. A number of job evaluation plans are in common use by various concerns, and some such system is essential to any sound wage-rate policy. As a rule, any company's general policy on wage rates will be influenced by rates paid in community industries for similar jobs requiring the same degree of skill and efficiency. In addition, there may be plans whereby rates of pay are adjusted in accordance with company earnings, productivity of the individual, cost-of-living index, etc. These factors all have a bearing on the control of labor costs, but are generally outside the jurisdiction of the cost accountant or shop supervisor.

Time Required

For a normal operator, the time required to do any job or operation is dependent upon the method and the equipment used. It follows that, in order to control direct labor cost, i.e., the time required, it is necessary to control the method and equipment used. The operator must not only be told "what to do," but also

"how to do it" and "what equipment to use." This means planning the job in detail and issuing comprehensive instructions so that the operator may perform the job in accordance with the plan.

Planning, as discussed in this paper, includes only manufacturing-method planning. *Manufacturing-method planning* covers a broad field of activities which may be briefly discussed under three main headings.

1. *Engineering Planning,* which involves an analysis of the requirements of the product, for the purpose of obtaining a design satisfactory not only to the engineering and sales organizations, but also to the manufacturing divisions.
2. *Production-Control Planning,* which may be considered as a survey of the equipment, material and personnel available for the manufacture of all products. This also includes:
   (a) The establishment and follow-up of production schedules consistent with balanced labor operations with the view to meeting customer's requirements for delivery of apparatus.
   (b) The determination of the capacity of, and the scheduled load on, both equipment and factory personnel.
3. *General Factory Planning,* which can be considered under two classifications:
   (a) *General Planning,* involving an analysis of manufacturing requirements such as:
      Plant buildings
      Floor-space requirements
      Machine-tool equipment
      Departmental layouts
   (b) *Job Planning,* which consisted of detailed analysis of specific jobs and operations.

To insure that each job or operation will be performed in accordance with the most economical methods of manufacture, all (or as nearly all as is practical) direct labor should be preplanned in detail and written instructions should be made showing:

1. Operations to be performed and the sequence of same.
2. Method to be used.
3. Tools and equipment required.

To insure that labor costs are commensurate with results to be expected from a normal operator working in accordance with the plan, and to insure that each operator receives a fair wage commensurate with the results of his efforts and the character of work which he performs, all (or as nearly all as practical) direct labor should be prepriced, per job or piece or operation. Such a procedure makes possible the accurate determination of what the labor cost should be before actual manufacture is begun. This fulfills one of our two fundamental requirements in the control of labor costs, i.e., knowledge of "how much it should be."

We have covered only in outline the important subject of planning, have merely mentioned job evaluation and the establishment of standards of performance, and have not touched at all upon methods of wage payment, all of which bear definitely upon our subject. More cannot be attempted here, since to cover each subject in detail is a task in itself. To summarize, the control of direct labor necessitates knowledge of "how much it should be" and "how much it is," which brings us to the factors:

1. Rate of pay of operator, which is determined by company policy, and
2. Time required, which is determined by the method and equipment used, which in turn is *planning.*

Good planning, then, is the keynote of control, and you can have good planning only if you have a capable and adequate planning organization.

Execution of Plan

Obviously, our goal will not be attained by good planning alone; there must be good execution of the plan by the producing organization. The factory must follow the plan as nearly as possible. Being human, we never maintain perfection; there will be cases of spoiled work, rework, and extra work which become a part of our actual cost. If we have good standards, the day-to-day control job is to control the variations from standard. We shall call these variations "extra labor costs." Now, what is a sound program for control of these extra labor costs?

Again, we must have knowledge concerning what is to be con-

trolled; therefore extra labor costs must be reported. A good report of extra costs will have the following objectives:

1. To acquaint management with the magnitude and trend of such costs.
2. To group them in a logical manner to show responsibility for control.
3. To report *all* of the extra costs.
4. To be available promptly.

The sources of the information may be either or all of the following:

1. Inspector's report
2. Extra-labor vouchers
3. Alteration notices
4. Direct-labor payroll analysis showing:
   (a) Machine setups
   (b) Planned labor
   (c) Miscellaneous unplanned labor
   (d) Extra labor due to special prices, rework, spoilage, etc.

In each case, it should be clearly indicated what caused the extra cost or loss, and what department is responsible. Some of the causes may be:

1. Engineering or drafting errors
2. Defective material
3. Limitations of equipment or methods
4. Limitations of material
5. Failure in test
6. Defective workmanship
7. Incorrect instructions
8. Additional allowance due to some temporary condition
9. Starting costs
10. Commercial requirements

With complete facts, logically and promptly presented, we are in a position to exercise some control. The details of methods of control may vary according to the size of the department and the type of product manufactured, but fundamentally, the key to the control of extra labor costs lies in five points:

1. Analysis of extra costs
2. Training of employees
3. Proper tools and equipment
4. Careful planning
5. Active interest

Analysis

It is axiomatic that, before any corrective action can be taken to reduce extra costs, we must know what the extra costs are and what causes them. We can usually find a solution to a problem if analysis shows that the problem exists. The initial requirement for analysis is to have a good basis of comparison. Our reports give us the dollar value of the extra costs and their causes. The question is "is the performance good or bad?" or "how does the actual compare with what it should be?" The best standard of extra labor costs which we have is the departmental budget or bogey. Therefore, setting up the bogey is of fundamental importance. A bogey of extra labor costs expressed in percentage of planned labor costs, should be established for each department before the beginning of the fiscal year. It should be set up by the department head who is responsible for meeting it, and should be at such a level that its realization means a good job.

Comparison of actual performance with the standard will indicate places and items needing attention. From such leads, we must dig deeper into the fundamental underlying causes and initiate the proper corrective action.

Training of Employees

One of the major causes of extra labor costs is poor work by operators who are not thoroughly familiar with their jobs, or who do not know how to perform the operations properly. Particularly in times of increasing production, the extra labor costs due to new and untrained help are large. To repeat, a well-organized selection and training program is an important factor in the control of labor costs.

Proper Tools and Equipment

A lack of proper tools or the failure to maintain tools in good condition is a source of extra labor costs. All new tools should

be carefully inspected before being used for production work, and the first pieces produced from these tools should be carefully checked. Periodic inspection should be made of all equipment and machines and tools, and those that are producing defective work should be taken out of the production line until they can be repaired. A system of preventive maintenance is helpful. The production system should provide for making available the necessary jigs and fixtures when required by the shop, otherwise there will be undue delays and extra labor costs.

Planning

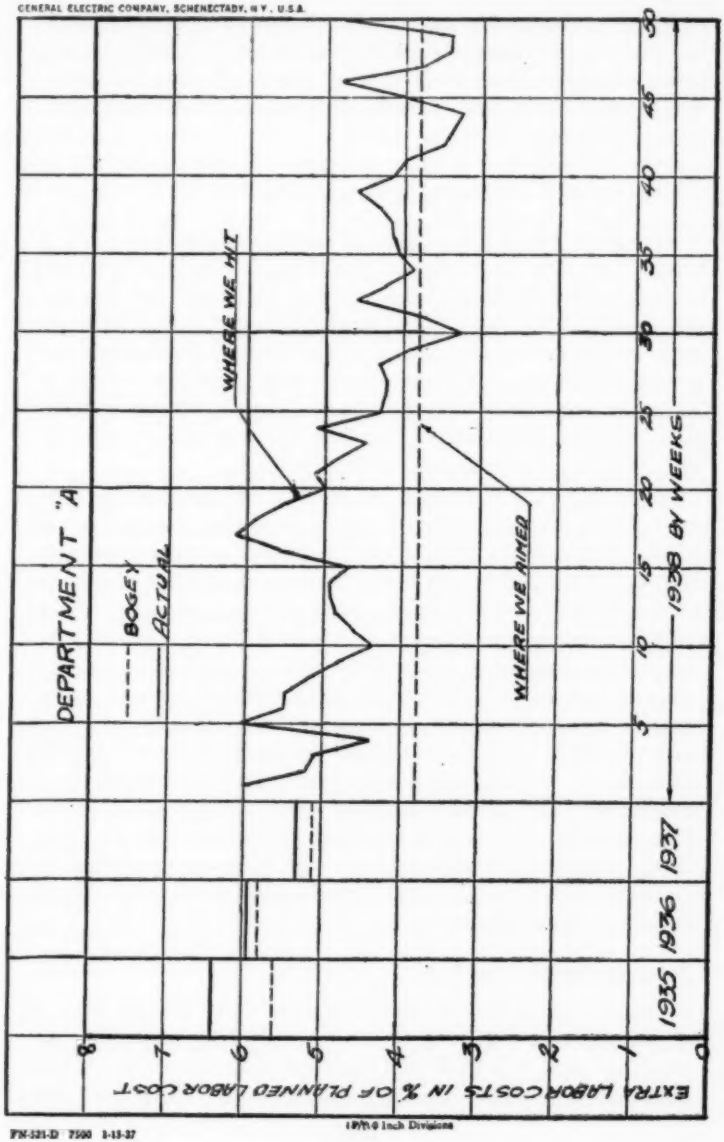
Careful planning is an important key to the control of labor costs. When new devices are introduced into production, the engineers, draftsmen, tool men, methods and wage-rate men, inspectors and factory supervisors should discuss among themselves the design, tools and methods. Handmade samples should be assembled before tools are ordered. Tool-made samples should be carefully tested before quantity production is begun. Such is good planning, which will lead to lower planned labor cost and less extra cost.

Active Interest

This is an intangible and elusive, but extremely important, factor in the control of extra costs. We do best those things in which we are interested. Therefore, it behooves management to stimulate interest in the entire organization towards meeting planned labor costs. The entire organization, including the operator on the bench or machine, should be made to appreciate the following facts:

1. That there is a bogey of extra cost.
2. That the bogey should be met.
3. That, to meet the bogey, control must be in advance of expenditure, not a review after the money is spent.
4. That preventive measures of control are more effective than corrective measures.
5. That, if corrective measures are necessary they must be taken immediately in order to minimize the extra cost.

Likewise, operators should be impressed with the importance of doing good work. In addition, departmental meetings to discuss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WHERE WE HIT
WHERE WE AIMED
EXTRA LABOR COSTS IN % OF PLANNED LABOR COST
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2
3
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1936
1937
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10
15
20
25
30
35
40
45
50
1938 BY WEEKS
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10/10 Inch Divisions

Exhibit 1

extra costs, display boards, charts, and posters all help to stimulate interest. A chart, similar to that shown in Exhibit 1, may be displayed to advantage in the department. To be most effective, it must be kept up to date and be made the subject of frequent discussion.

Indirect Labor

To control indirect labor also necessitates *knowledge* of "How much it is" and "how much it should be." The first is accomplished by periodic detailed reports from the payroll and accounting departments. To accomplish the second involves measurement or the setting of standards. The setting of standards and periodic comparison of actual expense with predetermined standards is the keynote of control. The first approach to the problem, then, is the establishment of standards or of a readily applicable measuring system which will reveal excesses.

Since indirect labor is the cost of supervision, services, etc., necessary to expedite actual production at a reasonable cost, it follows that indirect labor is justified only by the existence or anticipation of, and should bear a definite relationship to, volume of production. In other words, volume of production is the logical basis against which to measure indirect labor. Some readily available and practical index of volume of production must be selected. In repetitive manufacture of identical units or in enterprises where the output can be expressed in some common unit, such as gallons or tons, and where the production cycle is relatively short, *units of output* is the preferable index of volume of production. If there are many lines and types of product, and/or the production cycle is relatively long, direct labor dollars or productive man hours, provided direct labor costs are controlled, are a satisfactory index. In this discussion, direct labor dollars will be used as the volume index.

Valuable Budget First Step

The first problem is to develop a schedule of indirect labor at all volumes of production, which, in combination with other elements of cost, will yield the minimum total cost of production consistent with quality and service to customers. Such a schedule

of indirect labor will be called a variable budget, and the specific amounts will be termed the optimum indirect labor.

An analysis of the various types of indirect labor reveals that certain types vary in direct proportion to volume of production, whereas other types indicate a partial variation with production, and still other types are almost entirely independent of volume of production. With such a condition prevailing, it is necessary to consider each type of indirect labor independently. Likewise, it is necessary to consider separately the integral units or departments of the manufacturing organization.

Broadly speaking, a manufacturing organization can be classified by type of department as follows:

1. Administrative
2. Service
3. Productive

Administrative departments serve the entire plant, and their indirect labor should be measured against total plant production. Administrative labor will vary only slightly with volume of plant production.

Service departments may serve the entire plant or only certain productive departments. Generally speaking, the expense of those serving the entire plant should be measured against total plant production, and the expense of those serving only certain productive departments should be measured against the production of the departments served. The expenses of service departments may vary in different degrees with the volume of plant production, depending upon the type of service rendered.

The indirect labor of each productive department should be measured against its own production. Very large manufacturing departments having relatively long manufacturing cycles can be broken down to advantage into operating units to such a degree that one unit performs a single function or step in the manufacturing process. For example:

Transformer Department	Punch Press Department
	Coil and Insulation Department
	Tank Manufacture
	Bushing Manufacture
	Assembly and Test
	General

The physical layout, as well as the size, influences the breakdown. If a breakdown similar to that of the transformer department is made, the indirect labor of the general department is measured against the production of the total department, and the indirect labor of the separate subdivisions is measured against their respective production.

Preparation of a Variable Budget of Indirect Labor

Preparation of a budget should be by classes of expense for each department and should be prepared by, or under the direct supervision of, the department head whose responsibility it is to live within the budget allowance. This is very important because the department head knows best the detailed requirements of his department, and understands and respects the budget more, since it is his own. The procedure is as follows:

Determine for the department the probable range of production level (direct labor load) likely to be realized within a reasonable period of time, two years, for example; then choose the minimum and the maximum labor load which will include the previously determined range and, at the same time, cover a range of not less than 50 per cent of the direct labor capacity of the department. Next choose at least three intermediate labor loads, one of which is approximately the same as the current labor load. These five labor loads are the levels at which the optimum indirect labor is determined. In determining the allowable indirect labor at a particular load level, *assume that this load is to continue indefinitely without variation;* i.e., plan each element of indirect labor on the basis of stabilized production at the level being considered. This is very important. An example for a particular department "A" might be as follows:

	Dollars per Week
Current direct labor load	$6,000
Capacity direct labor	10,000
Probable range over two years	$4,000— 9,000
Budget points	$3,000—$4,500—$6,000—$7,500— 9,000

Next prepare a budget at each chosen labor load, similar to that shown on page 1003.

The number of employees is shown wherever possible, and the amount of expense is the aggregate of their weekly pay. When services such as maintenance are rendered by a central service

BUDGET OF INDIRECT LABOR

Weekly Basis—Amounts in $

DEPARTMENT "A"

	No. Emp.	Amount	No. Emp.	Amount	No. Emp.	Amount	No. Emp.	Amount	No. Emp.	Amount
DIRECT LABOR	100	$3,000	150	$4,500	200	$6,000	250	$7,500	300	$9,000
INDIRECT LABOR ACCOUNTS										
101 General Supervision	1	100	1	100	1	100	1	100	1	100
102 Salaried Foremen	5	255	6	305	7	355	8	405	9	450
105 Inspections	3	130	4	170	5	210	6	250	7	290
109 General Assistants	1	50	1	50	1	50	1	50	1	50
Supervision Total	10	535	12	625	14	715	16	805	18	890
111 Production Clerks	5	200	7	250	9	300	12	350	14	400
112 Stock Clerks	2	60	2½	70	3	80	4	100	4	100
113 Cost Clerks	2	90	2½	100	3	120	4	140	5	185
116 Time and Shop Clerks	3	60	4	80	5	100	6	120	7	140
117 Dispatchers	1	40	1	40	2	75	2	75	3	110
119 Planning Clerks	5	200	7	260	8	300	10	360	11	400
120 Other Clerks	3	65	3	65	4	85	5	105	6	125
Clerical Total	21	715	27	865	34	1,060	43	1,250	50	1,460
140 Helpers and Laborers	18	360	23	460	28	560	33	660	38	760
161 Crane Operators	3	75	3	75	4	100	4	100	5	125
162 Stockkeepers	3	90	4	115	4	115	5	140	5	140
163 Tool Crib Attendants	1	30	1	30	2	60	2	60	2	60
Service Total	25	555	31	680	38	835	44	960	50	1,085
191 Overtime D. L.		25		38		50		63		75
192 Overtime I. L.		5		7		10		12		15
195 Training emp.		30		45		60		75		90
197 Unassigned time		3		4		6		8		10
Idle time, etc. Total		63		94		126		158		190
201 Non-durable Tools		60		90		120		150		180
202 Shop Supplies		6		9		12		15		18
232 Rearrangement		30		40		50		60		70
240 Other Oper. Exp.		10		12		14		16		18
Tools, etc. Total		106		151		196		241		286
300 Maint. Buildings		60		60		60		60		60
320 " Mchs. Catal.		150		210		270		330		390
340 " Misc. Shop Equipment		200		250		300		350		400
361 " Electrical Apparatus		60		70		80		90		110
363 " Overtime		3		5		7		9		11
390 " Special Tools		90		135		180		225		270
Total Maintenance		563		730		897		1,064		1,231
Total Indirect Labor		2,537		3,145		3,829		4,478		5,142

department, it is not possible to visualize the expense in terms of number of people, but only in probable amount of charge. All of the values shown represent the composite judgment of the department head and his functional supervisors and, before final adoption, must be approved by the management. The figures represent the optimum indirect labor under normal operating conditions, as nearly as can be determined by present knowledge, methods and equipment, and conformance with long-term management policies and strict exercise of economy.

Use of Charts and Formulaes

In arriving at the optimum indirect labor amount, particularly for supervisory, clerical or service labor, each individual job should be considered and an affirmative answer arrived at for each of the four following questions.

1. Is the job essential?
2. Is the job worth what we anticipate paying?
3. Is the right individual on it?
4. Is the method efficient?

The answer to the first question is a matter of judgment; to the second, a matter of salary or job evaluation; to the third, a matter of employee evaluation; and to the fourth, a matter of judgment based upon knowledge and conditions.

We have now planned indirect labor, i.e. set optimum standards, at five levels of production. By plotting the values shown in rectangular co-ordinates with indirect labor as the ordinate and direct labor as the abscissa, it is possible to determine an emperical mathematical relationship between indirect labor and direct labor. A simple equation representing a straight line, shows the average trend indicated by the plotted points, and is the most practical relationship because of its simplicity. It also is generally quite accurate throughout any normal range of operation, say between 30 and 90 per cent of capacity. The simple equation expressing the trend of optimum indirect labor is, then, a fixed amount per week, plus a factor times the weekly direct labor. Below about 30 per cent of capacity, necessity may dictate the elimination of some activities and drastic curtailment of others which are profitable at a reasonable load. The projection of the chart to the zero

direct labor point is only for the purpose of determining graphically the fixed portion of the equation. The indicated fixed indirect labor, then, has no significance other than as a factor in the empirical equation used to interpret indirect-labor requirements within a reasonable operating range. During periods of extreme business depression, factors other than actual requirements influence management policy relative to expenses. Illustrative data are plotted on Charts 1 to 7, and the mathematical relationships for Department A are as follows:

VARIABLE BUDGET OF INDIRECT LABOR

DEPARTMENT "A"

Weekly Basis

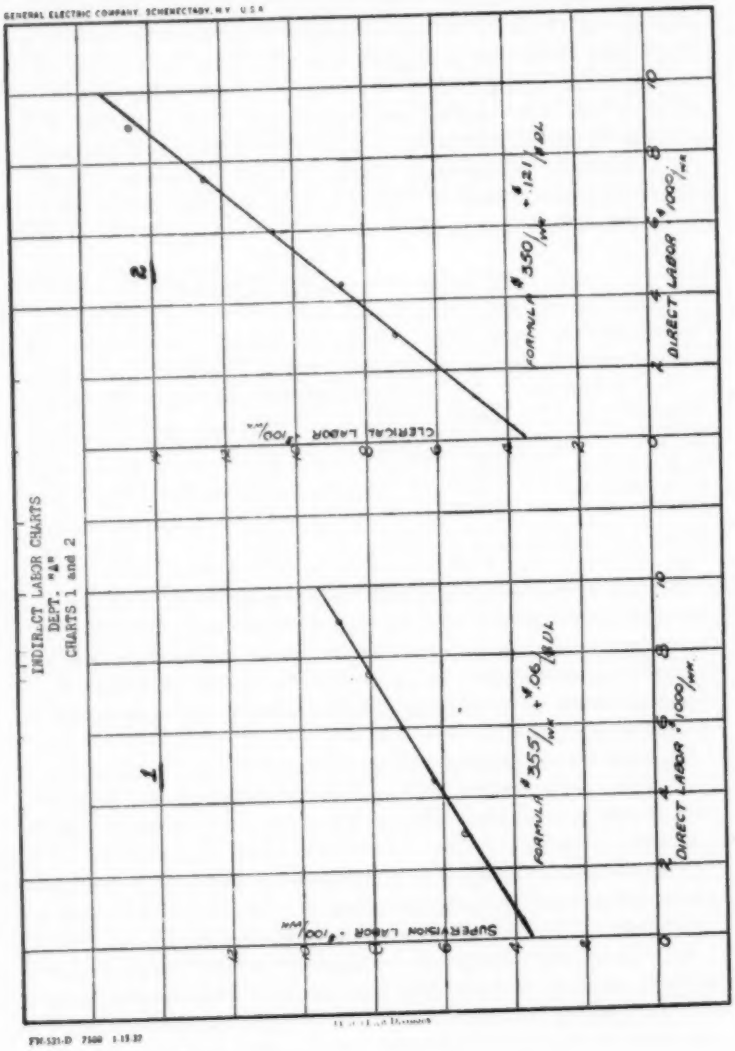
Class of Expense	*Fixed Labor per Week*	*Variable Factor per $ of Direct Labor*	*Notes*
Supervision .....Labor	$355	$ .0600	Chart No. 1
Clerical .....Labor	350	.1210	" " 2
Service .....Labor	280	.0911	" " 3
Overtime, etc. .....Labor	...	.0211	" " 4
Tools-Sup. etc. .....Labor	20	.0295	" " 5
Maintenance .....Labor	235	.1108	" " 6
TOTAL INDIRECT LABOR.....	$1,240	$ .4335	" " 7

It is, of course, possible to make charts and determine formulas for each individual account, but experience has indicated that this is not necessary. In the event that an excess expenditure in any group of accounts needs to be identified as to the particular account involved, the original details of the budget by accounts can readily be consulted.

Budgets for all departments, including service and administrative departments, should be prepared by the respective department heads in accordance with the principles set forth in the foregoing illustration.

There are certain general considerations that are important in the preparation and administration of a variable budget, some of which are stated in the next following paragraphs.

The theory of straight-line budgetary control assumes that labor is infinitely divisible, which is not true. It is obvious, then, that the greater the number of units of labor (people) involved, the more nearly the straight line approximates actual conditions, and, conversely, the smaller the number of units of labor, the less


GENERAL ELECTRIC COMPANY, SCHENECTADY, N.Y. U.S.A.
INDIRECT LABOR CHARTS
DEPT. "A"
CHARTS 1 and 2
2
1
CLERICAL LABOR ¢/100/HR
SUPERVISION LABOR ¢/100/HR
FORMULA $.350/HR + $.121/D.L.
FORMULA $.355/HR + $.06/D.L.
DIRECT LABOR $/100/HR
DIRECT LABOR $/1000/HR
FM-531-D 7500 1-15-37

nearly the straight line approximate actual conditions. It is reasonable, however, to assume that a straight line does represent the variation in *actual requirements* for a particular function.

There are types of indirect labor that are non-recurrent in character and may be of considerable magnitude, such as:

1. Major rearrangement projects
2. Major building-repair projects
3. Snow-removal expense

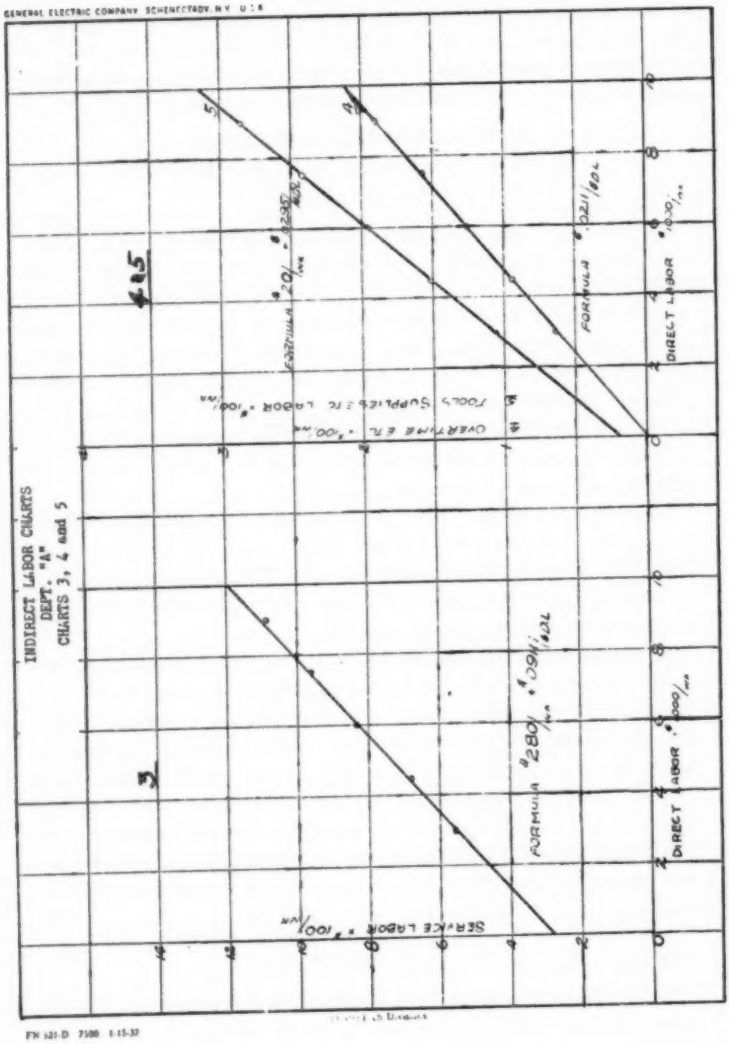
Such items are best handled separately from the variable budget on a project basis which is independent of volume of direct labor. Such treatment, however, may create some disagreement as to what is the dividing line between items to be considered as unusual and non-recurrent, and those to be considered as normal and recurrent and to be provided for in the regular variable budget. The main consideration is to treat items of this character in such a way that there is control of the expenditures, and so that the reporting of them does not distort comparisons of normal budget with current expense.

If there is a wide range of variables in the separate departments, the composite total plant budget must be determined by assuming a given distribution of total direct labor among the manufacturing departments. For any other distribution, the composite total budget then may not hold.

A similar condition may arise in service and administrative department budgets which are based on total plant direct labor. For example, a plant transportation department is a central service department and the transportation requirements per dollar of direct labor in Department "A" may be only half as much as in Department "B." A certain distribution of direct labor between the two departments must be assumed for budget purposes. Any marked deviation from the assumed distribution of direct labor will necessitate a change in the transportation department variable factor.

Administration and Use of Variable Budgets

Now having established a variable budget for each class of indirect labor in each department, how can we use it for control? *The value of any standard is determined by the use made of it.* As


GENERAL ELECTRIC COMPANY SCHENECTADY, N.Y. U.S.A.
INDIRECT LABOR CHARTS
DEPT. "A"
CHARTS 3, 4 and 5
415
3
FORMULA .20/ .8238
FORMULA .021/ .824
FORMULA .280/ .090/ .824
OVERTIME ETC. = 100/
TOOLS SUPPLIES ETC. LABOR = 100/
SERVICE LABOR = 100/
DIRECT LABOR .1000/
DIRECT LABOR .1000/
FM 521-D 7500 1-15-37

is the case in the control of direct labor costs, so it is with the control of indirect labor costs. We have determined in detail how much the cost should be at all volumes of production, and our task now is to deal with the exceptions. Extra indirect labor costs are subject to closer control than extra direct labor costs, principally because they can be anticipated to a degree.

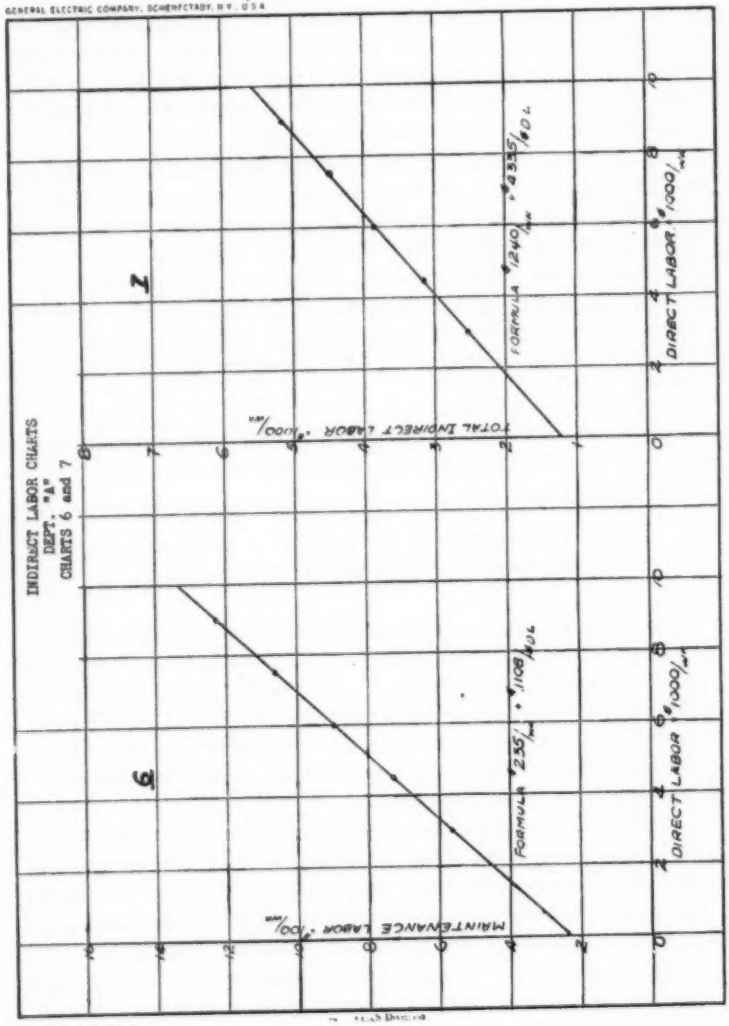
As a routine for control, the following procedure has proved to be most effective. At the beginning of each month, each productive department head is required to make out and submit to the management an estimate, by weeks for the month, of direct labor in total and of indirect labor in detail, in comparison with the variable budget allowance calculated at the estimated direct labor load. Any anticipated over-expenditure of budget allowance must be satisfactorily explained to the management. The estimate shows:

1. The particular accounts against which the anticipated over-run is to be incurred, and the amount of same.
2. The reason for the over-run, and how long it will continue.
3. If the over-run is not the result of a temporary abnormal condition, what steps are being taken to correct it?

If the forecast indicates a drop in direct labor, the indirect labor organization is reviewed critically, and the reductions necessary to meet the reduced allowance are planned. If the anticipated reduction is large enough to necessitate substantial reduction in personnel, the particular individuals to be laid off are selected and notified, and arrangements are made to redistribute the work among the remaining personnel.

The forecasted direct labor is summarized for the plant as a whole, and forms the basis for estimates from service and administrative departments and for budget calculations. The heads of service and administrative departments follow the same procedure in estimating as outlined for productive departments.

The departmental estimates are summarized into the estimate for the entire plant. Such a procedure is active expense control, i.e., the trend of expense is directed and controlled, rather than followed.


GENERAL ELECTRIC COMPANY, SCHENECTADY, N.Y., U.S.A.
INDIRECT LABOR CHARTS
DEPT. "A"
CHARTS 6 and 7
6
7
MAINTENANCE LABOR $/100 M/L
TOTAL INDIRECT LABOR $/100 M/L
FORMULA $2.35/M/L + $.1108 M/L
FORMULA $1.20/M/L + $.4335/M/L
DIRECT LABOR $/1000 M/L
DIRECT LABOR $/1000 M/L

Analysis Needed

Plans must be followed, however; accomplishments must be checked and failures analyzed. This means analysis of current expense in comparison with budget allowance and forecasts. Weekly, as a by-product of payroll distribution, each department head is given a statement for the previous week of departmental direct labor in total and of indirect labor expenditures by accounts. These detail figures are summarized by departments on a suitable form and the departmental budget allowance posted. The difference between actual and budget are shown for the week and cumulatively for the fiscal year. The "realization percentage," i.e. the ratio of budget allowance to actual expense, for the week and for the year to date, are shown. Provision is made for pertinent remarks by departments, and any general remarks that will facilitate interpretation of the figures can be written as a part of the report. Through this report, which is prepared weekly, the management can obtain an immediate and comprehensive analysis of the indirect labor in the plant. Attention need be devoted only to those departments which show an overexpenditure for which there is not a satisfactory explanation. In short, control of expense labor is accomplished by control of variance from standard.

Much of indirect labor, particularly that usually compensated on a salaried, rather than an hourly basis, is what might be termed "organization expense." It is, of course, undesirable to cause this expense to fluctuate from week to week with minor variations in production. Here policy, as well as current requirements for service, enters into the picture. A variable budget cannot be expected to reflect changes in policy because policy is not based upon production conditions in a particular department alone, but is influenced by conditions in the whole company, in the industry and in the nation at large. A variable budget can truly reflect only actual requirements as the dollar equivalent of man hours, and comparison of actual expense with the budget will give an evaluation of the cost of any change in policy relative to maintaining an organization during a declining production period. With a knowledge of the cost of a policy, management can exercise sounder judgment in formulating, continuing or changing its policy. The control of indirect labor cost is not only a matter of dealing with specific excesses above current require-

ments, but also a matter of management policy which is subject to change, depending upon changing conditions and changing forecasts of the future long-term business outlook.

To summarize, the control of labor costs necessitates knowledge of "how much it should be" and "how much it is." The difference between these amounts is what requires our constant attention in order that it may be kept at the practical minimum.

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